

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
11 November 2004 (11.11.2004)

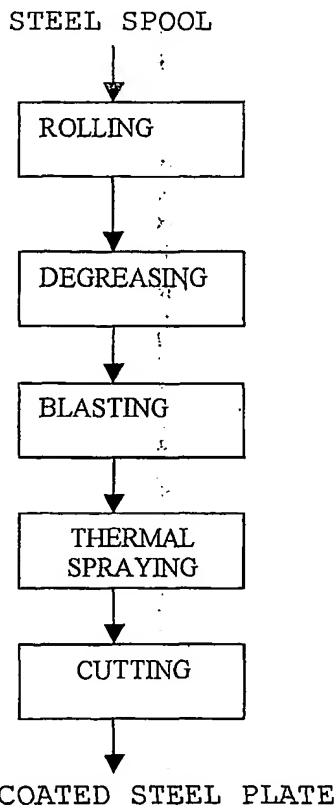
PCT

(10) International Publication Number  
**WO 2004/097061 A1**

- (51) International Patent Classification<sup>7</sup>: C23C 14/06, 16/40
- (21) International Application Number: PCT/BR2003/000117
- (22) International Filing Date: 18 August 2003 (18.08.2003)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:  
PI0301126-7 28 April 2003 (28.04.2003) BR
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- (81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

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(54) Title: USE OF THERMAL SPRAYING WITH NIOBIUM OXIDES AND NIOBIUM ALLOYS DURING THE PRODUCTION PROCESS OF ROLLED STEEL PLATES



(57) Abstract: This innovation describes the utilization of the Thermal Spraying with Niobium oxides and alloys in the manufacturing of rolled steel plates, to be applied in the production of thermal exchange equipment, or those that are exposed to atmospheres with corrosive gases in high temperature, as for example, H<sub>2</sub>S and CO<sub>2</sub>, as well as fumes from solvents and acids.

WO 2004/097061 A1



(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

11/10/03

10/552933

JC20 Rec'd PCT/PTO 11 OCT 2005

Description of the Patent of Invention for "Use of Thermal Spraying with Niobium Oxides and Niobium Alloys During the Production Process of Rolled Steel Plates".

#### TECHNICAL FIELD

5           This innovation refers to the use of niobium oxides and niobium alloys applied by the Thermal Spraying technique during the production of rolled steel plates manufactured by the pre-coated conventional process, on the train of rolls. As a result, flat, conformed or profiled steel plates could  
10 be industrially produced in large scale, already protected against highly corrosive environments, mainly in those presenting high temperatures, showing presence of gases such as H<sub>2</sub>S, SO<sub>2</sub>, CO<sub>2</sub> as well as fumes or acids.

#### BACKGROUND OF THE INVENTION

15           In the utilization of rolled plates in corrosive environments, it is common the use of Enamel as a anticorrosive coating. Notwithstanding, several problems take place during the assemblage of equipment as for example, heat exchangers and heat recuperators among others, since the  
20 Enamel does not have sufficient mechanical resistance to the rolling and eventual curving that the steel plates might have to endure.

Consequently, the coating loses adherence and exposes the steel to the corrosive environment, reducing the useful life of the rolled steel plates.

#### SUMMARY OF THE INVENTION

5 In its most general aspect, this invention proposes the use of Thermal Spraying with niobium oxides, niobium alloys and associations thereof with other metals, alloys or oxides as an anticorrosive coating, in the industrial production of plain or coated rolled plates, according to the application for the Brazilian Patent PI 0203534-0.

#### DETAILED DESCRIPTION OF THE INVENTION

The Brazilian Patent PI N.0203534-0 for this invention refers more particularly to the utilization of Thermal Spraying with niobium oxides and niobium alloys such as Al-Nb, Ni-Nb, among others, preferably the niobium oxides, during the manufacturing of plain or coated rolled steel plates. The steel plates production process and the niobium application obey traditional processes as the described below:

20 1- Degreasing of the plate right out from the rolling;

2- Blasting of the superior and inferior plate surfaces at SA 2½ degree;

3- Thermal Spraying by oxi-acetylene torch on both superior and inferior surfaces of the steel plate with niobium-based oxides and alloys;

4- Separation of the plates, by cutting, in the desirable dimensions on the rolling train;

5- Storage of the coated rolled steel plates;

6- Eventual shaping of the plates, by bending, profiling or any other specific demand from the consumer;

Figure 1 represents, in block diagram, a conventional manufacturing process for rolled steel plates.

Among the advantages of the Thermal Spraying application in the production line of rolled steel plates are the improvement of the adherence providing plate conformations for bending, profiling or any other shaping without the exposition of the substrate to the corrosive environment, as well as the improvement of the superficial state, preparing it to receive the finishing coat of paint.

CLAIMS

1-."Use of Thermal Spraying with Niobium oxides and  
Niobium alloys During the Production Process of Rolled Steel  
Plates."Characterized by applying Niobium, its oxides and  
5 alloys such as Ni-Nb,Al-Nb, among others, in the production  
of coated steel plates.

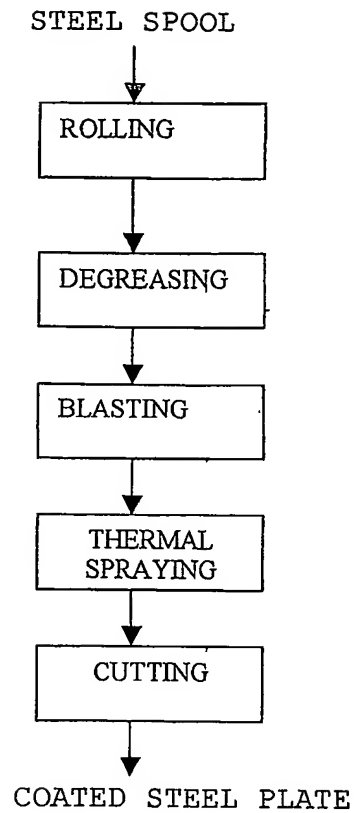
**10/552933**FIGURE

Figure 1

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/BR 03/00117-0

## CLASSIFICATION OF SUBJECT MATTER

IPC<sup>7</sup>: C23C 14/06, 16/40

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC<sup>7</sup>: C23C, C22C, B23B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPI, EPODOC, STN-Patdpa, Depatisnet

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 1054075 A1 (RENAULT) 22 November 2000 (22.11.00) <i>claims.</i>	1
A	US 5111567 A (LEINO et al.) 12 May 1992 (12.05.92) <i>claims.</i>	1
A	US 6238807 B1 (YASUDA et al.) 29 May 2001 (29.05.01) <i>claims.</i>	1
A	US 4609401 A (SIMM et al.) 2 September 1986 (02.09.86) <i>claims.</i>	1
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☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

## \* Special categories of cited documents:

„A“ document defining the general state of the art which is not considered to be of particular relevance

„E“ earlier application or patent but published on or after the international filing date

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„O“ document referring to an oral disclosure, use, exhibition or other means

„P“ document published prior to the international filing date but later than the priority date claimed

„T“ later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

„X“ document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

„Y“ document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

„&amp;“ document member of the same patent family

Date of the actual completion of the international search

10 December 2003 (10.12.2003)

Date of mailing of the international search report

19 February 2004 (19.02.2004)

Name and mailing address of the ISA/AT

Austrian Patent Office

Dresdner Straße 87, A-1200 Vienna

Facsimile No. 1/53424/535

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## INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/BR 03/00117-0

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